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Barriers to Deciding on a Consumption-based Model for Funding IT

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ABSTRACT

This study explores the factors that hinder IT departments in moving towards a consumption-based operating model (OpEx). The study explores the views of major stakeholders in a large global technology company around the possible introduction of the model for its services. These views are triangulated with the views of a select number of external experts. IT funding decisions have been complex problems for organisations, and because IT investments are so pervasive they are extremely important. Peffers & Dos Santos (2013) argue that in the real world there are conflicts between the nominal IT funding practices and the actual IT operational practices currently being employed. The IT funding process skews the downstream management controls. They suggest that further research into this area is critical to understand the dynamism between the two. The study uses the lens of Behavioural Cloudonomics. Behavioural Cloudonomics is at the intersection of psychology, economics, and the cloud and is well positioned to help us understand and address the psychological factors that underpin the economic decision-making behaviours around the move to the Cloud.

KEYWORDS

OpEx, IT funding, consumption-based, Behavioural Cloudonomics, business capabilities, agility.

1. Introduction

Traditionally IT infrastructure requires significant upfront financial investment, as well as time and labour to progress through a staged procurement process that usually involves multiple layers of approval. Purchases are generally ordered and managed through a central procurement section. However, most CIOs know that their functions need to become faster and more agile in the provision of services to support the opportunities and threats posed by digital disruption.

Cloud computing represents the commercialisation of infrastructure, platform and application services provided by such technology companies as Amazon, Microsoft and Alibaba. Public Cloud Computing (PCC) can be a more cost effective solution than 'traditional' internal IT services because organisations only pay for what they use. PCC is dropping the barrier to entry for start-ups and small and medium enterprises (SMEs) requiring access to cutting edge technologies to compete in the market place (Avram, 2013). It eliminates the heavy up-front cost (CapEx) of traditional IT services and can be 'spun up' relatively quickly in support of changes in organisations. However, the benefits of reduced costs do not always result in savings, especially as consumption can increase for what is sometimes viewed as an almost 'limitless' resource.

Any change in IT operations are provisioned may trigger an organisation to revisit decisions about its funding model for IT investments. For example, traditionally IT investments are funded through project-based budgets based on a CapEx model for capital outlays. But the move to PCC, may prompt organisations to consider funding IT services through product line

budgets based on an OpEx model for consumption-based outlays. But key changes to an IT department's operations or funding models require the backing of senior executives. However, the funding models used by IT Departments in many large companies (such as this MNC) have changed little despite the increasing take-up of PCC.

Based on the industry experiences and engagements of the authors, nearly all such companies postulate that moving to a consumption-based model for funding IT is the 'right thing' to do but many are struggling with how to do so in practice. For this reason, the objective of this study is to explore the perceived difficulties in introducing a consumption-based (OpEx) model into a traditional IT department currently using a CapEx model.

In this paper we adopt a behavioural economics approach to understand the effects of psychological, cognitive, emotional, cultural and social factors on making the decision to move to the alternative model. According to Peffers & Dos Santos (2013) research to accommodate this dynamism in IT funding decision making and downstream management control, is critical and should provide many opportunities for important and impactful research (Peffers & Dos Santos, 2013). They propose that it is important to understand the theory of what should be going on, versus the practice of what is actually happening, in order to streamline the current processes to enable the business units to become agile. Intuitively people react better, and make better choices, when they are given a choice rather than when somebody else's choice is foisted upon them. The study examines the behavioural-economic elements faced when traditional IT departments are trying to move from a capital expenditure (CapEx) heavy model to more of a consumption-based (OpEx) model. We find that this alternative model is not so acceptable to some internal stakeholders for a multitude of reasons. The remainder of the paper is structured as follows. We begin with a review of background literature. We follow this with an overview of the research methodology and a list of the interviewees. Next the findings are reviewed. We finish with a discussion and some concluding remarks.

2. Background

There are a number of different definitions of Cloud Computing. The first use of "cloud computing" in a modern context is believed to have occurred on 9th August 2006, when then Google CEO Eric Schmidt introduced the term at an industry Search Engine Strategies Conference. Schmidt said, *"What's interesting [now] is that there is an emergent new model, I don't think people have really understood how big this opportunity really is. It starts with the premise that the data services and architecture should be on servers. We call it cloud computing—they should be in a "cloud" somewhere."*(Conference, 2006) Since then, there have been many varying definitions of Cloud Computing but for the purposes of this paper we are going to use the US Department of Commerce's definition of Cloud Computing: *"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."*(Mell & Grance, 2013). This definition encompasses the fact that Cloud Computing can be provided from within an organisation's own data centres (being run by its own IT teams), from the public cloud (provided by the likes of Amazon, Microsoft, Alibaba, etc.) or a hybrid of both.

2.1. Economics of Cloud Computing

One of the key characteristics of cloud computing is that the consuming organisations can in real time unilaterally provision computing capabilities as needed without requiring human interaction with the service provider. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. The resources can be elastically provisioned and released scale rapidly outward and inward commensurate with demand. There may therefore be a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources. The resource usage of each consuming organisation is monitored, controlled, and reported, providing transparency for both the provider and consumer. Typically, this is done on a pay-per-use or charge-per-use basis.

Public Cloud Computing offers many potential advantages including reduced cost, process efficiency, enhanced agility, improved compliance, etc.. One would expect that cloud enabled services would reduce overall IT spend, but this may not always be the case. Under normal economic conditions a reduction in price tends to increase demand. Stanley Jevons, a 19th Century economist, observed that in certain circumstances the increase in demand can actually offset the reduction in price. For example, with cloud computing there are two important drivers; a reduction in total cost of computing or storage means that more computing can be performed without increasing the overall cost; as unit cost is reduced it will increasingly substitute for other activities e.g. video conferencing can substitute for travel for face to face meetings. Economists call this Jevons' Paradox (Jevons & Flux, 1906).

2.2. Funding Models and Justification

The concept of Measured Service addresses the challenges being faced by traditional IT departments in their efforts to move from a capital heavy funding model (CapEx) to a consumption-based model (OpEx) that is better aligned with the introduction of PCC. According to Peffers and Dos Santos (2013) there are two dimensions to IT Funding: Justification Dynamism and Justification Evidence

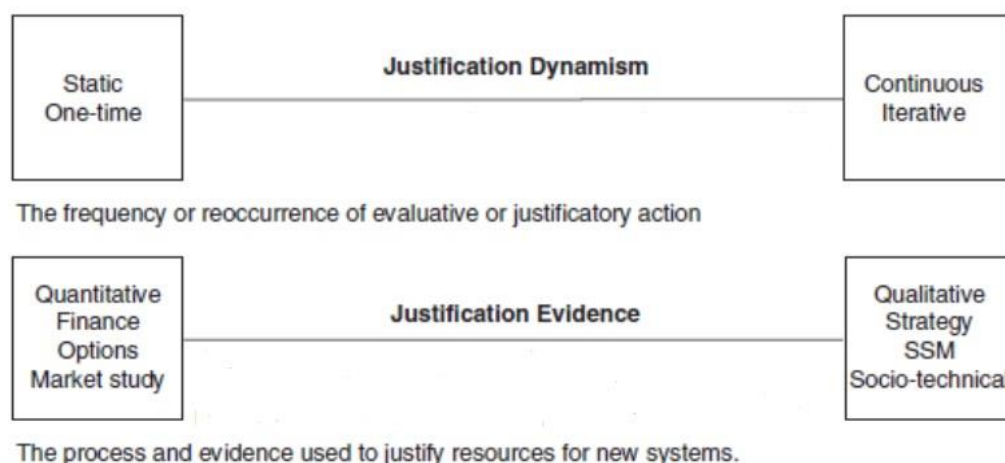


Figure 1 Dimensions of IT Funding (Peffers & Dos Santos, 2013)

In the first dimension, the justification of IT funding is moving along the continuum from Static One-time towards Continuous Iterative. The strategic imperative of IT investments and the dynamic nature of change is requiring faster responses. Thus, it is no longer certain that projected costs and benefits or even functional requirements will remain the same over the

lifetime of the project, much less the expected lifetime of a new system or application (Clemons, 1986; Myers, 1984; Rockart, 1979). Another trend sees the emergence of incremental approaches to development. A further trend has seen that an increasing number of IT infrastructure investments are not tied to specific projects or applications. Traditionally infrastructure and applications were justified together. To the extent that the infrastructure components are nowadays independent of the applications, they are now longer easily linked to specific benefits. Instead infrastructure components create options for companies to make subsequent investments in applications for new processes and services (Benaroch & Kauffman, 1999).

In the second dimension there has been a move away by a number of companies from the exclusive use of accounting methods towards a mix of quantitative and qualitative methods based not just on the nature of the investment, but also on the social and cultural context in which the company operates and the view of the company's affiliation to this context (Peffer & Dos Santos, 2013).

3. Methodology

The qualitative research interview is the most widely used qualitative research method (Polkinghorne, 2005) and has been used extensively in multiple disciplines, including Information Systems (IS). The goal of qualitative research interviewing is to see the research topic from the perspective of the interviewees, and to understand how and why they come to have this particular perspective. Qualitative interviews are like night goggles, *‘permitting us to see that which is not ordinarily on view and examine that which is looked at but seldom seen’* (Rubin & Rubin, 2005). To meet this goal, the qualitative research interviews undertaken in this study had the following characteristics: a low degree of structure imposed by the interviewer (lead author); a preponderance of open questions; and a focus on ‘specific situations and action sequences in the world of the interviewee’ (Kvale, 1983) rather than abstractions and general opinions imposed by the interviewer.

3.1. Interviewees

This study interviewed nineteen elite interviewees. Fifteen interviewees were senior members of the global technology company ranging from Senior Manager/Consultant to Vice President, whilst four were from external companies – see Table 1. The semi-structured interviews we either conducted face-to-face or via video conferencing. All the interviews were recorded and transcribed. Each of the interviews recorded lasted between 20mins and 50mins.

Interviewees	Alias	Role	MNC/Other	Country
Interviewee 1	IE1	Senior Director, Financial Controller	MNC	IE
Interviewee 2	IE2	Business Consultant	MNC	IE
Interviewee 3	IE3	IT Director, Global Messaging Services	MNC	IE
Interviewee 4	IE4	Senior IT Consultant, Infrastructure and Engineering Operations	MNC	IE

Interviewee 5	IE5	IT Director, Global Data Centers	MNC	US
Interviewee 6	IE6	Director, MNC e-Commerce site.	MNC	IE
Interviewee 7	IE7	IT Consultant, Team Member Experience Strategy	MNC	US
Interviewee 8	IE8	Senior Advisor, IT Product Manager	MNC	IE
Interviewee 9	IE9	Consultant, IT Infrastructure Program Manager	MNC	IE
Interviewee 10	IE10	Owner, Cloud Hosting Data Center	Data Center Company	IE
Interviewee 11	IE11	Chief Technical Officer	Channel Partner	IE
Interviewee 12	IE12	Director, IT Master Architect, CTO Office	MNC	IE
Interviewee 13	IE13	Consultant, IT Finance	MNC	US
Interviewee 14	IE14	Chief Technical Officer, EMEA Enterprise Architect Presales	MNC	IE
Interviewee 15	IE15	Regional IT Manager, Nordics and Benelux	MNC	DK
Interviewee 16	IE16	Director, IT Enterprise Architect	MNC	IE
Interviewee 17	IE17	Vice President, Business Transformation	MNC	IE
Interviewee 18	IE18	Director, EMEA Marketing	SaaS Company	IE
Interviewee 19	IE19	Head of Research	Public Utility Company	IE

Table 1: List of Interviewees.

4. Discussion of Findings

Behavioural Cloudonomics is described as the intersection of psychology, economics, and the cloud — it is used to make sense of the appeal of the cloud and to understand and address barriers to its adoption (Weinman, 2010). Weinman (2010) introduces the “The 10 Laws of Behavioural Cloudonomics”. The findings from the interviews are presented in relation to

each of the laws. Eight of the laws could be directly identified in the transcripts – see Figure 1- and these are now described in turn.

Alias	Risk and Loss Aversion	Flat-Rate Bias	Need for Control and Autonomy	Fear of Change	The Endowment Effect	The Status Quo Bias and Escalation of Commitment	Hyperbolic Discounts and Instant Gratification	The Zero-Price Effect	Need for Status	Paradox of Choice
IE1	x	x			x	x				
IE2		x	x	x		x			x	
IE3		x	x			x				
IE4	x		x	x		x	x		x	
IE5		x		x					x	
IE6			x			x				
IE7		x		x		x				
IE8		x		x			x			
IE9			x	x	x					
IE10			x							
IE11	x	x		x		x				
IE12		x							x	
IE13		x	x	x		x				
IE14										
IE15	x	x	x							
IE16	x	x								
IE17			x							
IE18		x	x	x		x				
IE19	x	x		x	x	x				
	6	13	10	10	3	10	2	0	4	0

Table 2 – Occurrence of 10 Laws in Interviews

4.1. Risk and Loss Aversion

There are emotional and perceptual asymmetries between losses and gains. A loss is perceived to be more painful than a commensurate gain is pleasurable. For example losing a \$10 bill can be more irritating than finding one is joyful. Certainly, CIOs must exercise due diligence regarding proposed cloud initiatives, but should also be aware that these asymmetries may cause some concerns to be over weighted relative to benefits such as total cost reduction and enhanced agility (Wailgum, 2009). IE16 believes that there should be an, “allowance of failure. It shouldn’t be a case where everything fails. You have to produce something of value. You can operate with a certain level of failures but that has to be at industry standard”. As we can see from the matrix, IE16 was not alone in the view that for the adoption of a full Cloud Operating Model an allowance had to be made for a certain level of failure. Culturally, the allowance for failure within the organisation is not high at present.

4.2. Flat-Rate Bias

One effect of loss aversion is that consumers often prefer flat-rate plans even when pay-per-use would cost less. With flat rates or up-front capital expenditures, the charges are never in doubt. The cloud’s pay-per-use pricing for on-demand resources typically reduces total cost while enhancing scalability, but the perception of a dollar saved may not outweigh the fear of increased consumption. Flat-rate buckets, monitoring and reporting, and auto-scaling policy management with maximum capacity limits can help (Lambrecht & Skiera, 2006). IE5 states that “Sometimes you get unintended consequences when you go to ‘chargeback’(OpEx). We have a captive market and if some business unit decides to suddenly move their applications outside of the IT data centers to make some savings, the costs for all of the other internal business units go up because we (IT) have to cover our charges”. He had experienced that exact issue in one of his previous companies. Furthermore, IE8 says, “The consumption

model is more in tune with the modern way of working. The Fixed Assets approach of sitting at the desk with fixed requirements that do not change is passé. ITs challenge is to challenge Finance's old way of thinking." As we can see from the matrix this was the Law that concerned most of the interviewees with regards to Behavioural Cloudonomics.

4.3. Need for Control and Autonomy

Author David Rock reports that people have a deep-seated need for control over their environment, or they may exhibit "learned helplessness" (Rock, 2019). Owning a data center may provide a perception of greater control over assets, making dashboards, portals, transparent policies and fine-grained management essential for cloud providers. Autonomy — "I can do it myself!" — is an important driver for cloud computing. Developers can autonomously procure infrastructure resources, and platform services enable the democratization of IT (Rock, 2019). IE9 says, *"It is difficult for say some Application Teams to relinquish infrastructure. Historically some teams would provision 'x' amount of storage, CPU and memory. They might 'over' provision because they know it is easier to 'over' provision even though they may only use or may only need to scale once or twice a year. It is easier to do that. There would be a perception that if you move to an OpEx Model you are taking away infrastructure that I already have. But in fact, if you are not using it you are paying for something you are not using. That concept of 'possession is nine tenths of the law' could be some impediment to change".* IE2 states, *"I have been in DevOps project environments and it is fantastic to work in. When you needed to do something with the infrastructure you reached to the guy next to you and he got it done immediately".* As we can see from the matrix, there is a need for self-service to be introduced to allow users feel they have a degree of control and autonomy in how they receive their IT services and to hide the present complexity from the end users. IE4 states that *"when the development team can't get their infrastructure from the Infrastructure team they just go to the public cloud. Another proof point that public cloud works. They can get what they want when they want it".*

4.4. Fear of Change

Rock also observes that people are often uncomfortable with uncertainty and therefore fear change (Rock, 2019). The cloud offers not just new technologies but the possibility of new business models. Consequently, overcoming the inertia of the traditional fixed asset model may require free trials, unalterable and explicit privacy policies, and/or multiyear price guarantees (Rock, 2019). IE2 states that *"traditional IT departments find it difficult to go to the Cloud Operating Model because they have thousands of people doing it one way and people don't like change".* IE8 says, *"A key blocker moving from CapEx to OpEx is the way the Finance allocation works in combination with the business units. If they (the business units) were to take control of the cost as they consumed the services, they would need to reorganise themselves".* For any transformation there are three legs of the stool that must be taken into account: people, process and technology. People are probably the most challenging as evidenced by the relatively high score in the matrix.

4.5. The Endowment Effect

People value goods they already own more than they would pay to acquire them. Shampnan'er et al (2007) showed that for the same hard-to-acquire Duke basketball tickets, students were willing to pay up to about \$170, but weren't willing to sell them for less than

\$2,400. Add in the choice-supportive bias, which rationalizes selected options and discounts unselected ones, and a stubborn fondness for existing IT technology and organization assets can be understood (Shampanier, Mazar, & Ariely, 2007). IE1 states, *“You already have made an investment, sunk costs. You would want to optimise these. That would be a big reason you would not want to move.”* IE19 says his company has a very captive customer base. *“This suits a very stable architecture on the IT side. We also have cost certainty with it”*. As evidenced in the low score in the matrix the Endowment Effect does not appear to be a big challenge for this company at present

4.6. The Status Quo Bias and Escalation of Commitment

Moreover, people tend to prefer things the way they have always been and invest additional amounts in past strategies which they have pursued. Again, this can lead to inertia slowing the adoption of new approaches (“Status quo bias,” 2019). IE13 believes that in, *“Central Corporate Finance there is a lack of appetite to allow a cross-charge model across business units that show consumption. Their fear is too much red tape and administration that you don’t need to worry about on a \$2bn budget (moving peas on a plate).”* IE3 says, the *“discipline of Operational Excellence is still paramount within the company. We need to go beyond that and deliver more modern services”*. Again, given the high score this received among the interviewees this is an important ‘Blocker’ to moving forward.

4.7. Hyperbolic Discounts and Instant Gratification

People tend to discount future risks and benefits hyperbolically. For example, a chocolate chip cookie is perceived as being much more valuable now than in an hour. This may promote a move towards the cloud, which promises instant gratification via on-demand services. Moreover, the “pain” of payment is deferred, thus discounted (“Hyperbolic discounting,” 2019). IE5 believes, *“If the Finance people are willing to understand that it will take 2-3 years of more cost to get there (cloud operating model) we can do it. But Finance in most cases want to make the clean cut immediately which will not work. You can’t necessarily track all the benefits until you see all the benefits.”* IE8 states, *“SaaS companies are in the business of providing simple solutions. So if IT is not providing the service they need, the Business Units will switch”*. Whilst there was some commentary around this Law by the interviewees, given its low score it is not viewed as being a major challenge for this company.

4.8. Need for Status

Rock (2019) points out that humans have fine-grained status detectors. For cloud adoption, the status associated with managing a large IT organization with a substantial asset base needs to be replaced by the status associated with being perceived as an innovator through the use of cloud services (Rock, 2019). IE12 believes that there is a *“Competitive element to it (budgeting). At the budgeting table people are vying over 10s of millions of dollars. Interpersonal dynamics of the people at play at the budgeting table.”* IE4 says, *“People and Process can be summed up as your Operating Model, the way you run your business as an IT organisation. From a People point of view, it is the Why (What’s in it for me?)”*. For the people implementing the changes within this company, it is something to be aware of but given the low score in the Matrix it is not something that is expected to be a major obstacle.

5. Conclusions

Thirteen of the nineteen interviewees found that the Current Financial Model was the biggest ‘Blocker’ to the implementation of a Consumption Model in a traditional IT Department. Nearly all of the internal IT interviewees made the point that the Finance Department is still very traditional in its operations and worldview, which are more suited to a ‘Waterfall’ methodology. IE4 states that *“Finance historically would have been regarded as risk averse”*. Many of the other internal interviewees also perceived that historically the Finance Department has been ‘risk averse’. The current funding model creates a situation where there is a long lead time for provisioning infrastructure; weeks to go through the approval process and months to go through the ordering process. This is difficult when the business landscape is changing so quickly. As a result IT is seen as slow. According to IE8, *“Each of the business units is connected to Finance by a Financial Controller. It is not in the DNA of a Financial Controller to do anything about this issue. There is a lack of willingness for them to devote time to solving this issue.”* Several of the interviewees talked about the yearly ‘locked in’ budget being hard to deal with because it is hard to predict vendor prices, which change throughout the year. One of the other struggles that has been observed is around ‘timing’. They say that they have observed that they can create an operating plan at the beginning of the year but that they have seen that IT priorities normally change during the year. A budget that IT will spend a lot of effort in creating can be ‘out of date’ within a week or two of its creation.

When transitioning to an OpEx model some uncertainty however is introduced. This makes forecasting for Finance and IT much harder and creates new dynamics in the decision-making process. In their view Finance Departments that have their IT Departments moving to a Cloud operating model need to transition to a more iterative process, like Rolling Forecasting, but that can only happen over an extended time period. Rolling Forecasting would be easier in an OpEx world but that would have to be underpinned by cost optimisation activities to be acceptable.

One of the IT project teams is currently working on a scheme to implement Showback¹ and then bring Chargeback² into the IT Department. They have observed that there is a lack of appetite to allow cross-charging across the Business Units to show what is being consumed. There is fear that it may create too much red tape and administration that the business does not want to concern themselves about.

The Finance team argue that when you are looking at ‘blockers’ IT has to look at the previous investments the company has made i.e. its sunk costs. The company will want to optimise these. That seems to be a big reason why the Finance Department appears reluctant to move from a CapEx heavy model to a more consumption-based one. Also, as IT starts using more and more public cloud services they have the risks associated with moving from owning and managing their own equipment to one of having an outside provider doing that for them externally. IE1 believes, *“There are financial implications to managing and accepting what that risk might be. This could be to the brand, or to the company, or in whatever way may be something that the company may not willing to take on.”*

The Finance Department believe IT needs to articulate better the outcomes that they are trying to achieve. They believe that IT should still be given a fixed budget but instead of it

¹ Showback consists of providing IT management, departments, and corporate management with an analysis of the IT costs due to each department, without actually cross-charging those costs.

² Chargeback (in business use) is an act or policy of allocating the cost of an organization's centrally located resources to the individuals or departments which use them.

being annual they may be given it multi-annually instead. They argue that IT needs to look at this change over a longer horizon because they will always be limited in the resources they are going to be allowed to use. If IT can't quantify the outcomes they are trying to achieve, even the soft ones, they will find it difficult to attract funding.

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